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PLUMBING SYMBOLS							
SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	ANGLE VALVE		FIRE LINE		LOW PRESSURE CONDENSATE		SNOW MELTING SYSTEM RETURN
	BACKFLOW PREVENTER		FLANGE		LOW PRESSURE STEAM SUPPLY		STEAM TRAP
	BACK WATER VALVE		FLOOR CLEAN OUT		MEDIUM PRESSURE CONDENSATE		STORM SEWER LINE (ABOVE GRADE)
	BALL VALVE		FLOOR DRAIN		MEDIUM PRESSURE STEAM SUPPLY		STORM SEWER LINE (BELOW GRADE)
	BASEBOARD RADIATION		FLOW MEASURING & BALANCING DEVICE		OVERFLOW RAIN WATER LEADER		STRAINER
	BRASS UPRIGHT PENDENT TYPE SPRINKLER HEAD		FLOW MEASURING & BALANCING DEVICE, WITH ISOLATION VALVE		OVERFLOW ROOF DRAIN		TEMPERATURE GAUGE
	BUTTERFLY VALVE		FUEL OIL SUPPLY		OXYGEN PIPING		TEMPERED WATER
	CHECK VALVE W/DIRECTION INDICATED		FUEL OIL RETURN		PIPE ANCHOR		THREADED HOSE CONNECTION
	CHILLED WATER SUPPLY		FUEL OIL VENT		PIPE GUIDES		TRIPLE DUTY VALVE, WITH COMBINATION SHUT-OFF, BALANCING, AND CHECK VALVE WITH MEASURING CONNECTIONS
	CHILLED WATER RETURN		GATE VALVE		PIPE CAP		UNION
	CHROME PLATTED RECESSED TYPE SPRINKLER HEAD		GLOBE VALVE		PIPE DOWN		VACUUM LINE
	CLEAN OUT		HIGH PRESSURE CONDENSATE		PIPE UP		VENT
	COMPRESSED AIR LINE		HIGH PRESSURE STEAM SUPPLY		PLUG VALVE		VERTICAL PENDENT TYPE WINDOW SPRINKLER HEAD
	CONDENSATE DRAINAGE		WALL HYDRANT		PRESSURE GAUGE		WATER HAMMER ARRESTOR
	CONDENSER WATER SUPPLY		HOSE BIBB		PRESSURE REDUCING VALVE WITH INLET AND OUTLET PRESSURE		WALL CLEAN OUT
	CONDENSER WATER RETURN		HOT WATER (120°) (ABOVE GRADE)		QUICK CLOSING, FUSIBLE LINK VALVE		WATER METER
	CONNECT TO EXISTING		HOT WATER (120°) (BELOW GRADE)		RAIN WATER LEADER		
	CONTROL VALVE (2-WAY)		HOT WATER (140°)		REDUCED PRESSURE BACKFLOW PREVENTOR		
	CONTROL VALVE (3-WAY)		HOT WATER RECIRCULATION PIPING (120°) (ABOVE GRADE)		ROOF DRAIN		
	COLD WATER (ABOVE GRADE)		HOT WATER RECIRCULATION PIPING (120°) (BELOW GRADE)		SIDEWALL PENDENT TYPE SPRINKLER HEAD		
	COLD WATER (BELOW GRADE)		HOT WATER HEATING SUPPLY		SANITARY SEWER LINE (ABOVE GRADE)		
	COLD WATER - HARD		HOT WATER HEATING RETURN		SANITARY SEWER LINE (BELOW GRADE)		
	EXISTING (SAN, HW, CW, ETC.)		INTERRUPTIBLE GAS PIPING		SECURITY BARS		
	FIN TUBE RADIATION		LIQUID PROPANE GAS		SNOW MELTING SYSTEM SUPPLY		

HVAC SYMBOLS							
SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	ACCESS DOORS, VERTICAL/HORIZONTAL		FREEZE STAT		RECTANGULAR DUCT W/ACOUSTICAL LINING		SHOE TAKE-OFF (45° ANGLE INLET)
	BULLHEAD TEE WITH TURNING VANES		SPIN-IN TAKE-OFF		GAS PRESSURE REGULATOR		SQUARE (MITERED) ELBOW
	CARBON DIOXIDE SENSOR		GAS PIPING		REFRIGERANT LIQUID LINE		SQUARE (MITERED) ELBOW W/TURNING VANES
	CONNECT TO EXISTING		GRAVITY BACKDRAFT DAMPER IN DUCT		REFRIGERANT SUCTION LINE		SQUARE TO ROUND TRANSITION, 15° MAXIMUM ANGLE
	CONCENTRIC TRANSITION, 15° MAXIMUM ANGLE		HVAC OCCUPANCY SENSOR		RELIEF/EXHAUST AIR (UP) (POSITIVE PRESSURE)		STRAIGHT LATERAL TAKEOFF (ROUND DUCT)
	EXHAUST AIR OR OUTSIDE AIR INTAKE (UP) (NEGATIVE PRESSURE)		LIQUID PROPANE GAS		RELIEF/EXHAUST AIR (DOWN) (POSITIVE PRESSURE)		STRAIGHT TAP TAKE-OFF
	EXHAUST AIR OR OUTSIDE AIR INTAKE (DOWN) (NEGATIVE PRESSURE)		MANUAL VOLUME DAMPER IN DUCT		RETURN DUCT (UP)		SYMMETRICAL DOVE TAIL WYE
	FIRE DAMPER IN DUCT		MOTORIZED OPERATED DAMPER IN DUCT		RETURN DUCT (DOWN)		TEMPERATURE SENSOR TO CONTROL EQUIPMENT X
	FIRE/SHOCK DAMPER IN DUCT		NATURAL GAS		ROUND DUCT WITH SIZE INDICATED		THERMOSTAT TO CONTROL EQUIPMENT X
	FLEXIBLE DUCT		RADIUS ROUND ELBOW (RADIUS OF CENTERLINE OF DUCT EQUAL TO 1.5 X DUCT WIDTH OR DIAMETER)		SUPPLY DUCT (UP)		
	FLEXIBLE CONNECTION IN DUCT		RECTANGULAR DUCT W/SIZE INDICATED		SUPPLY DUCT (DOWN)		

GENERAL MECHANICAL/PLUMBING SPECIFICATIONS					
<b>1.1 SCOPE:</b>					
<b>A. PROVIDE ALL LABOR, MATERIALS AND EQUIPMENT NECESSARY FOR COMPLETE AND OPERATIONAL SYSTEMS DESCRIBED IN THIS SPECIFICATION OR SHOWN ON THE PLANS UNLESS INDICATED OR NOTED OTHERWISE. IT IS THE INTENT OF THE DRAWINGS AND SPECIFICATIONS THAT ALL SYSTEMS BE COMPLETE AND READY FOR OPERATION.</b>					
<b>B. PLUMBING CONTRACTOR SCOPE:</b> DWY SYSTEM, DOMESTIC WATER SYSTEM, AND NATURAL GAS SYSTEM, WHICH SHALL INCLUDE ALL ASSOCIATED EQUIPMENT, HANGERS, INSULATION, VALVES, ACCESS PANELS, ETC.					
<b>1.2 SITE:</b>					
<b>A. EXAMINE PREMISE AND UNDERSTAND THE CONDITIONS THAT MAY AFFECT WORK OF THIS DIVISION BEFORE SUBMITTING BIDS. NO SUBSEQUENT ALLOWANCE FOR TIME OR MONEY WILL BE CONSIDERED FOR ANY CONSEQUENCE DUE TO A FAILURE TO EXAMINE SITE CONDITIONS.</b>					
<b>1.3 LICENSE, FEES, AND PERMITS:</b>					
<b>A. CONTRACTOR MUST RETAIN AND PAY FOR ALL LICENSES REQUIRED BY THE CITY AND STATE. THE MECHANICAL CONTRACTOR SHALL BE RESPONSIBLE FOR ARRANGEMENT OF REQUIRED INSPECTIONS AND PAYMENT OF ALL INSPECTION FEES.</b>					
<b>B. OWNER SHALL PAY FOR ALL REVIEW AND PERMIT FEES.</b>					
<b>C. PLUMBING PLANS AND REVIEW FEES HAVE BEEN SUBMITTED TO THE MINNESOTA DEPARTMENT OF LABOR AND INDUSTRY FOR REVIEW.</b>					
<b>1.4 CODE AND FRANCHISE COMPLIANCE:</b>					
<b>A. ALL MECHANICAL/PLUMBING WORK SHALL COMPLY WITH APPLICABLE NATIONAL, STATE, OR LOCAL CODES; LAWS, ORDINANCES; REGULATIONS; AND/OR FRANCHISE REQUIREMENTS. IF CONTRACTORS ARE AWARE OF CONFLICTS BETWEEN PLANS OR SPECIFICATIONS AND SUCH CODES OR REGULATIONS, THEY SHALL BE BROUGHT TO THE ENGINEER'S ATTENTION PRIOR TO COMMENCING APPLICABLE WORK. IF CONTRACTORS KNOWINGLY PERFORMS WORK IN VIOLATION OF SUCH CODES OR REGULATION, WHETHER OR NOT SUCH VIOLATION IS SHOWN OR SPECIFIED, THE CONTRACTOR SHALL BE HELD RESPONSIBLE FOR THE CORRECTION OF THE VIOLATION AT NO ADDITIONAL CHARGE.</b>					
<b>B. CODE COMPLIANCE IS MANDATORY. NOTHING IN THESE DRAWINGS AND SPECIFICATIONS PERMITS WORK NOT CONFORMING TO THESE CODES. WHERE WORK IS SHOWN TO EXCEED MINIMUM CODE REQUIREMENTS, COMPLY WITH DRAWING AND SPECIFICATIONS.</b>					
<b>1.5 DRAWINGS AND SPECIFICATIONS:</b>					
<b>A. MECHANICAL/PLUMBING PLANS SHOW GENERAL ARRANGEMENT OF PIPING, DUCTWORK, EQUIPMENT, ETC. FOLLOW AS CLOSELY AS PERMITTED BY ACTUAL BUILDING CONSTRUCTION AND WORK OF OTHER TRADES. BECAUSE OF THE SMALL SCALE OF MECHANICAL PLANS, IT IS NOT POSSIBLE TO INDICATE ALL OFFSETS, FITTINGS, AND ACCESSORIES THAT MAY BE REQUIRED. INVESTIGATE STRUCTURAL AND FINISH CONDITIONS AFFECTING THIS WORK AND ARRANGE WORK ACCORDINGLY, PROVIDING SUCH FITTINGS, VALVES, AND ACCESSORIES REQUIRED TO MEET THE CONDITIONS.</b>					
<b>1.6 RECORD DRAWINGS:</b>					
<b>A. MAINTAIN ONE SET OF CLEAN WORKING DRAWINGS AT THE JOB SITE AND RECORD "AS-BUILT" INFORMATION FOR ANY CHANGE OR MODIFICATIONS TO THE CONSTRUCTION DOCUMENTS.</b>					
<b>1.7 GUARANTEE:</b>					
<b>A. GUARANTEE THE INSTALLATION FREE FROM DEFECTS OF WORKMANSHIP AND MATERIALS OF A PERIOD OF ONE (1) YEAR AFTER DATE OF CERTIFICATE OF FINAL PAYMENT, AND PROMPTLY REMEDY AND DEFECTS DEVELOPING DURING THE PERIOD WITHOUT CHARGE.</b>					
<b>1.8 SUBSTITUTIONS:</b>					
<b>A. WHEREVER POSSIBLE, MORE THAN ONE MANUFACTURER HAS BEEN LISTED FOR VARIOUS ITEMS OF EQUIPMENT, ANY ONE OF WHICH WILL BE ACCEPTABLE. BASE THE BID OR USE OF MATERIALS SPECIFIED. IF A SUBSTITUTE OF PROPOSED AFTER AWARD OF THE CONTRACT, THE REQUEST FOR PERMISSION TO SUBSTITUTE SHALL BE ACCOMPANIED WITH A STATEMENT OF THE MONEY TO BE RETURNED TO THE CONTRACT IF THE SUBSTITUTE IS PERMITTED. THE OWNER IS THE SOLE JUDGE OF ACCEPTABILITY OF SUBSTITUTIONS. IF A SUBSTITUTE ITEM IS PERMITTED, AND ANY REDESIGN EFFORT IS THEREBY NECESSITATED, THE REQUIRED REDESIGN SHALL BE AT THE CONTRACTOR'S EXPENSE.</b>					
<b>1.9 COORDINATION:</b>					
<b>A. COORDINATE WORK WITH OTHER TRADES TO AVOID CONFLICT AND TO PROVIDE CORRECT ROUGH-IN AND CONNECTION FOR EQUIPMENT FURNISHED UNDER OTHER TRADES THAT REQUIRE MECHANICAL/PLUMBING CONNECTIONS. INFORM CONTRACTORS OF OTHER TRADES OF THE REQUIRED CLEARANCES AROUND ELECTRICAL EQUIPMENT TO MAINTAIN SERVICEABILITY AND CODE COMPLIANCE.</b>					
<b>B. VERIFY EQUIPMENT DIMENSIONS AND REQUIREMENTS WITH PROVISIONS SPECIFIED UNDER THIS SECTION. CHECK ACTUAL JOB CONDITIONS BEFORE FABRICATION WORK. REPORT NECESSARY CHANGES IN TIME TO PREVENT NEEDLESS WORK, CHANGES OR ADDITIONS SUBJECT TO ADDITIONAL COMPENSATION THAT ARE MADE WITHOUT WRITTEN AUTHORIZATION AND PRICE AGREEMENT, SHALL BE AT CONTRACTOR'S RISK AND EXPENSE.</b>					
<b>C. ALL LOW VOLTAGE WIRING, WHICH IS RELATED TO MECHANICAL EQUIPMENT, SHALL BE BY THE MECHANICAL CONTRACTOR.</b>					
<b>1.10 BASIC MATERIALS AND METHODS:</b>					
<b>A. MECHANICAL/PLUMBING CONTRACTOR SHALL BE RESPONSIBLE FOR REQUIRED DIGGING, CUTTING, ROUGH-IN AND CONNECTION TO WORK OF THIS DIVISION AND MAKE REQUIRED REPAIRS AFTERWARDS TO SATISFACTION OF ENGINEER. CUT CAREFULLY TO MINIMIZE REPAIRS TO EXISTING WORK. DO NOT CUT BEAMS, COLUMNS, TRUSSES, OR ANY STRUCTURAL MEMBER.</b>					
<b>B. PATCH AND REPAIR WALLS, FLOORS, CEILINGS, AND ROOFS WITH MATERIALS OF SAME QUALITY AND APPEARANCE AS ADJACENT SURFACES UNLESS OTHERWISE SHOWN. SURFACE FINISHES SHALL EXACTLY MATCH EXISTING FINISHES OF SAME MATERIALS.</b>					
<b>C. ADJUST LOCATIONS OF PIPES, EQUIPMENT, FIXTURES, ETC. TO ACCOMMODATE WORK FROM INTERFERENCE ANTICIPATED AND ENCOUNTERED, DETERMINE EXACT ROUTE AND LOCATION OF EACH PIPE PRIOR TO FABRICATION.</b>					
<b>D. IF OTHER THAN SPECIFIED EQUIPMENT IS INSTALLED AND DOES NOT FIT JOB SITE CONDITIONS, THE MECHANICAL CONTRACTOR ASSUMES RESPONSIBILITY FOR REPLACEMENT WITH ITEMS NAMED IN THE RELEVANT SPECIFICATION.</b>					
<b>1.11 SITE UTILITIES:</b>					
<b>A. WATER AND SANITARY SEWER SHALL BE CONNECTED TO MAIN AND BROUGHT INTO BUILDING BY SITE UTILITY CONTRACTOR.</b>					
<b>B. SITE CONTRACTOR SHALL BRING STORM SEWER WITHIN 5 FEET OF BUILDING. PLUMBING CONTRACTOR SHALL TIE IN FROM BUILDING.</b>					
<b>C. UTILITY COMPANY SHALL PROVIDE AND INSTALL NATURAL GAS LINE TO BUILDING AND METER. MECHANICAL CONTRACTOR SHALL COORDINATE WITH UTILITY COMPANY LOCATION OF NATURAL GAS METER. MECHANICAL/PLUMBING CONTRACTOR SHALL BRING NATURAL GAS FROM METER INTO BUILDING OR BELOW GRADE TO NECESSARY EQUIPMENT.</b>					
<b>D. WELL CONTRACTOR SHALL BRING WATER INTO MECHANICAL ROOM.</b>					
<b>E. SANITARY SEWER SHALL BE CONNECTED TO EXISTING SANITARY SEWER INSIDE OF BUILDING.</b>					
<b>F. WATER SHALL BE CONNECTED TO EXISTING WATER SERVICE INSIDE OF BUILDING.</b>					
<b>G. WATER AND SANITARY SEWER SHALL BE CONNECTED TO MAIN AND BROUGHT WITHIN 5 FEET OF BUILDING BY SITE UTILITY CONTRACTOR. PLUMBING CONTRACTOR SHALL BRING WATER AND SANITARY SEWER FROM WITHIN 5 FEET OF BUILDING INTO BUILDING.</b>					
<b>H. GREASE TRAP TO BE INSTALLED BY PLUMBING CONTRACTOR.</b>					



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MINNESOTA

DATE: 12.03.14

MECHANICAL SYMBOLS AND  
LEGEND

PROJECT  
CONSTRUCT NEW IT CENTER  
FOR HEALTH CARE  
TECHNOLOGY MANAGEMENT  
EXPANSION

DATE  
12.03.14

REVISION  
AS NOTED

PROJECT NO.  
656-14-246

DATE  
12.03.14

REVISION  
M001



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100% CONSTRUCTION DOCUMENTS



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MECHANICAL ROOF PLAN

2

PLUMBING FIRST FLOOR PLAN

1

PLUMBING BASEMENT PLAN

GENERAL NOTES

1. ALL ISOLATION VALVES SHALL BE LOCATED IN ACCESSIBLE LOCATIONS.
2. COORDINATE UNDERGROUND PIPING SYSTEMS WITH FOUNDATION CONTRACTOR PRIOR TO INSTALLATION.
3. SEE PLUMBING FIXTURE SCHEDULE FOR INDIVIDUAL PLUMBING FIXTURE CONNECTION SIZE REQUIREMENTS.
4. SEE SHEET M202 FOR ALL DRAIN, WASTE, VENT AND DOMESTIC WATER PIPING ISOMETRICS.
5. COORDINATE ALL PLUMBING PIPING WITH HVAC AND ELECTRICAL EQUIPMENT.
6. PLUMBING CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS.
7. ALL PLUMBING FIXTURES SHALL HAVE INDIVIDUAL SHUT-OFF VALVES.
8. FLUSH AND SEAL ALL ROOF PENETRATIONS TO MAKE WATERTIGHT.
9. CHANGES IN DIRECTION IN DRAINAGE PIPING MUST BE MADE BY APPROPRIATE WYES AND BENDS. SANITARY TEES ARE NOT ALLOWED WHERE THE DIRECTION OF FLOW CHANGES FROM EITHER VERTICAL TO HORIZONTAL OR HORIZONTAL TO HORIZONTAL.

KEYNOTES

1. COORDINATE FLOOR DRAIN LOCATION WITH HVAC & PLUMBING EQUIPMENT.
2. VERIFY PLUMBING REQUIREMENTS OF CRAC UNITS PRIOR TO INSTALLATION.
3. 3/4" CW TO CRAC UNIT. PROVIDE APPROVED BACKFLOW PREVENTER AS REQUIRED BY CODE.
4. VERIFY PLUMBING REQUIREMENTS OF AC-1 UNIT PRIOR TO INSTALLATION.
5. 1/2" CW TO AC-1 UNIT. PROVIDE APPROVED BACKFLOW PREVENTER AS REQUIRED BY CODE.
6. PRIMARY AND SECONDARY ROOF STORM DRAINAGE RAN THROUGH SCUPPERS.
7. SP-1 & SP-2 SHALL SEND ALARM TO BUILDING MANAGEMENT SYSTEM FOR PUMP OPERATION. A SECOND ALARM FOR OVERFLOW. ALARMS BY JCI.
8. NO CONNECTIONS TO EXISTING SANITARY SHALL BE MADE DUE TO POOR EXISTING CONDITIONS.
9. CW SHUT-OFF VALVE WITH TAMPER SWITCH SHALL BE READILY ACCESSIBLE AND NOT LOCKED. TAMPER SWITCH SHALL SEND ALARM TO BUILDING MANAGEMENT SYSTEM. ALARMS BY JCI.
10. COORDINATE VENT STACK LOCATIONS WITH MECHANICAL CONTRACTOR PRIOR TO INSTALLATION.
11. AVOID RUNNING CW OVER ELECTRICAL EQUIPMENT.

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PROJECT

CONSTRUCT NEW IT CENTER FOR HEALTH CARE TECHNOLOGY MANAGEMENT EXPANSION

BUILDING

NEW IT

DESIGNED BY

JDM

DRAWN

AJF

SCALE

M201

ST. CLOUD VA HCS

ST. CLOUD, MN 56303

St. Cloud VA Health Care System

Brainerd | Montevideo | Alexandria

three inches = one foot  
one and one half inches = one foot  
one inch = one foot  
three quarters inch = one foot  
one half inch = one foot  
three eighths inch = one foot  
one quarter inch = one foot  
one eighth inch = one foot

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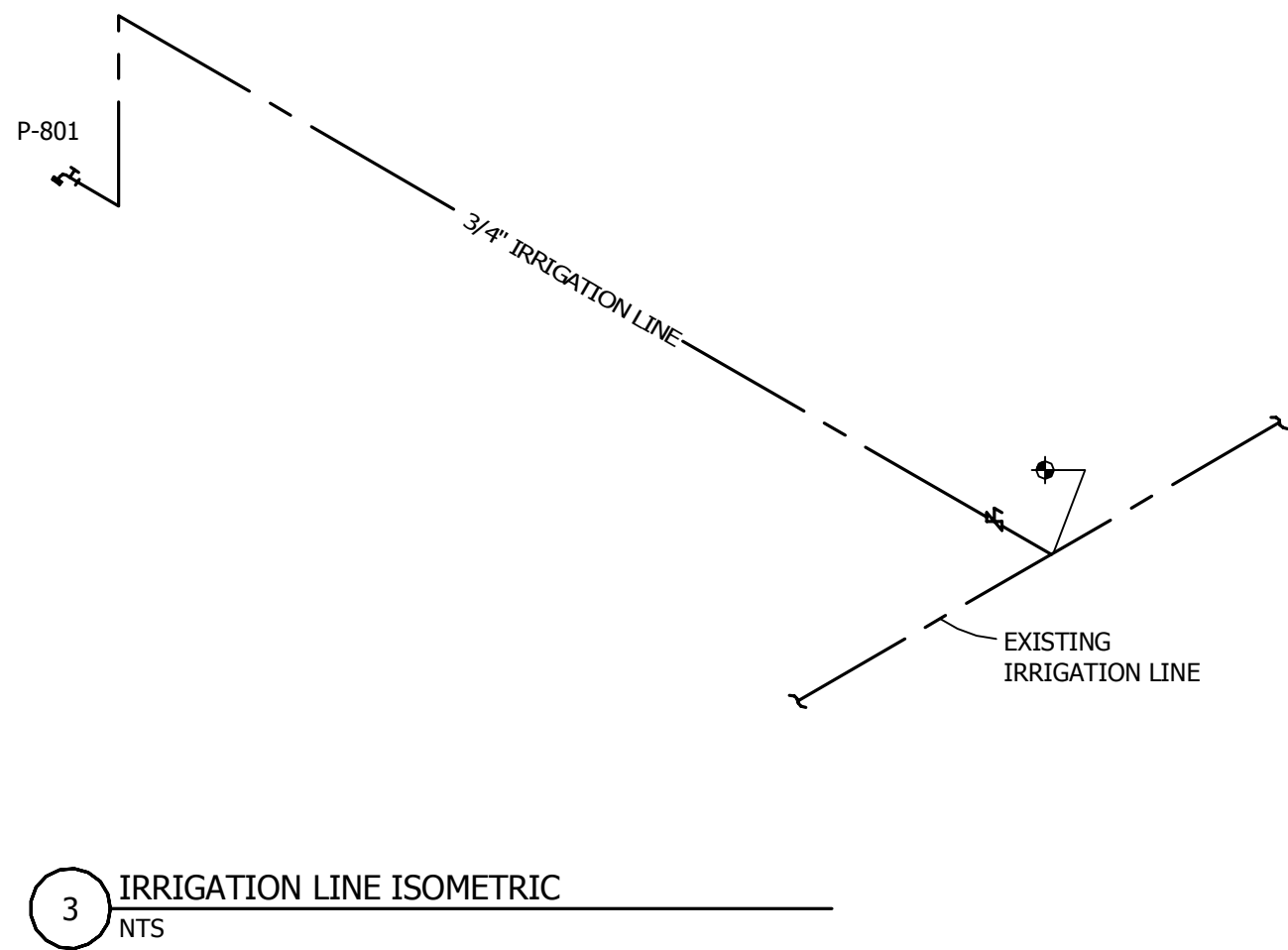
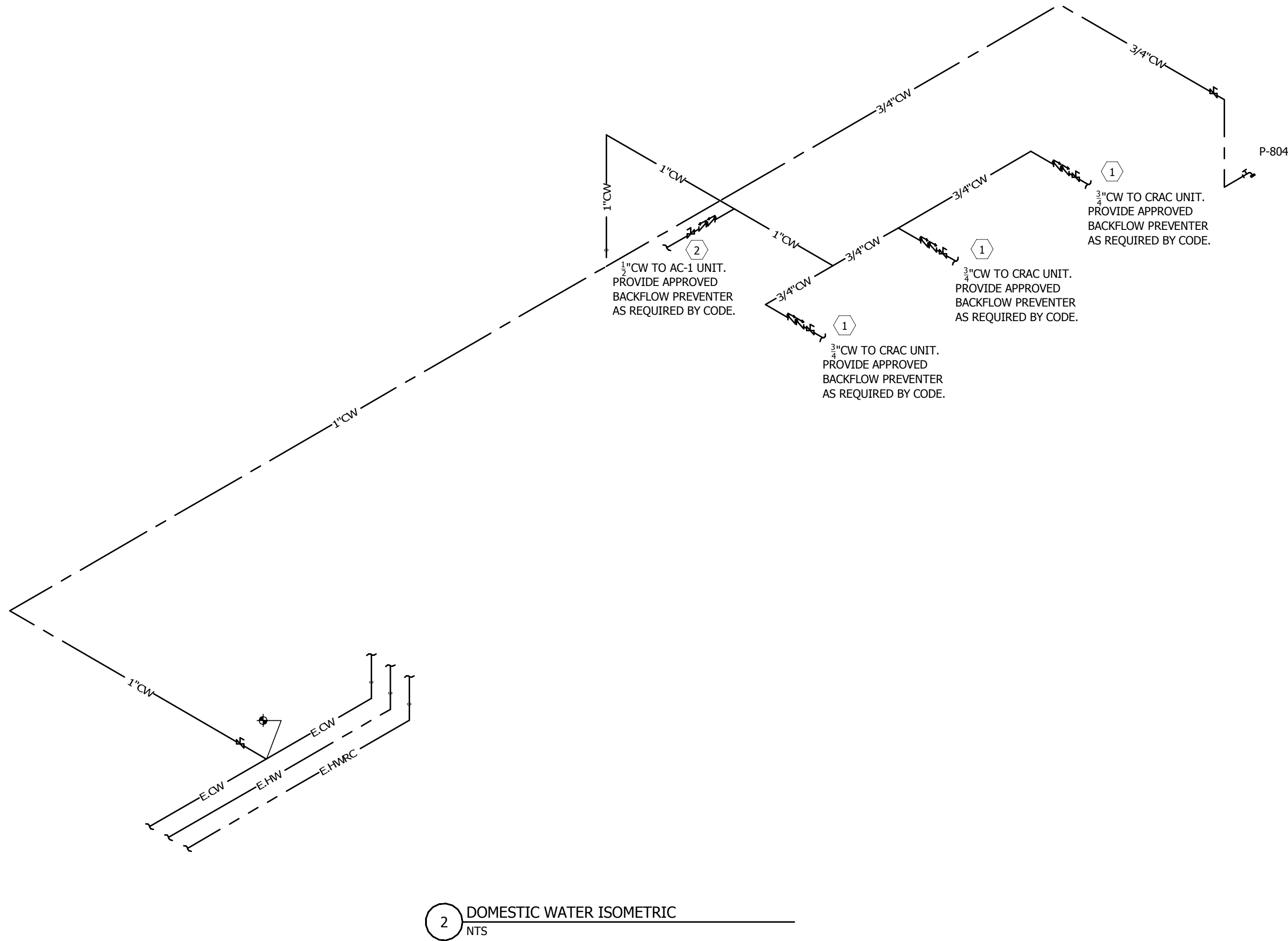
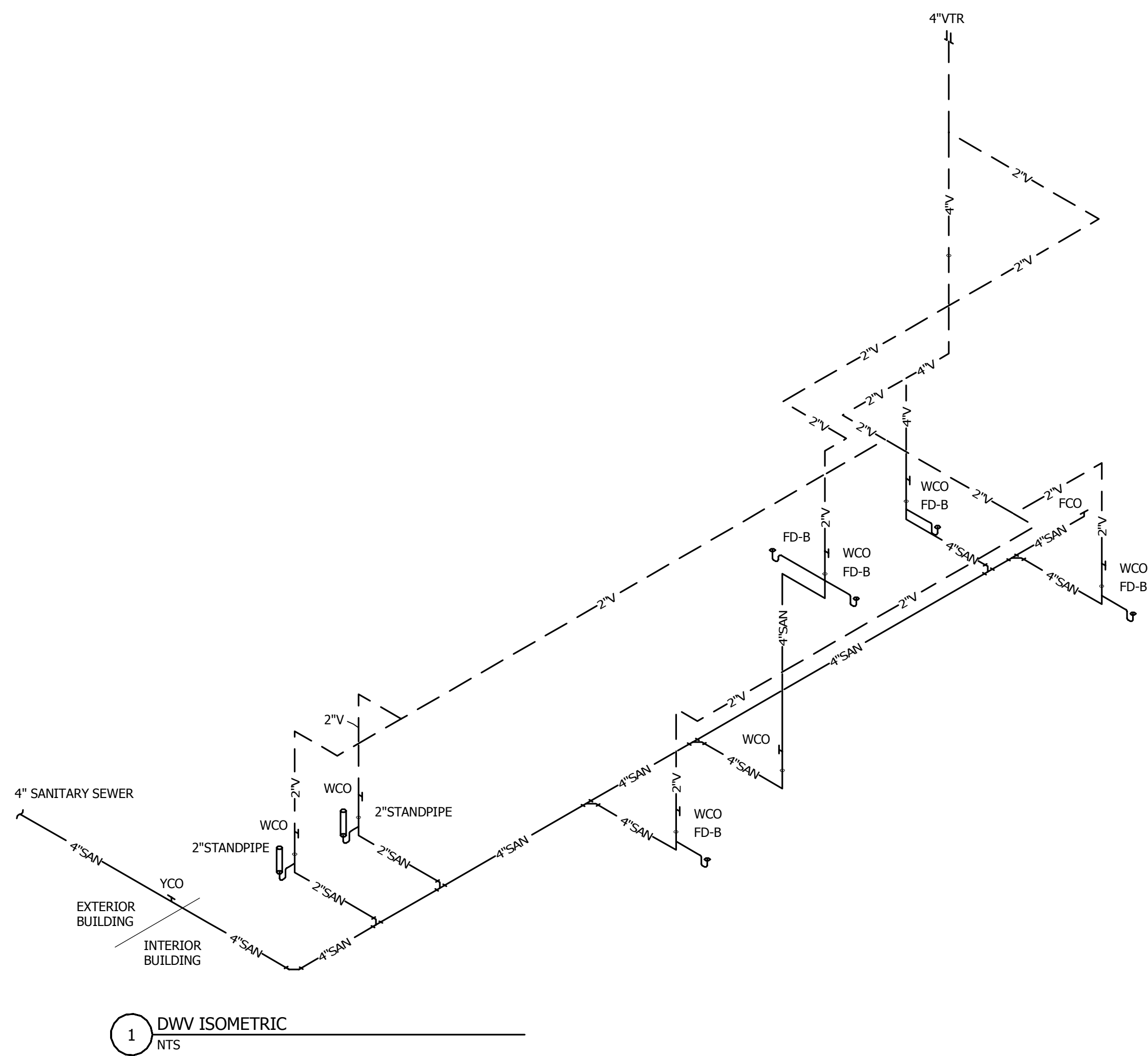
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GENERAL NOTES	
1.	ALL ISOLATION VALVES SHALL BE LOCATED IN ACCESSIBLE LOCATIONS.
2.	SEE PLUMBING FIXTURE SCHEDULE FOR INDIVIDUAL PLUMBING FIXTURE CONNECTION SIZE REQUIREMENTS.
3.	COORDINATE ALL PLUMBING PIPING WITH HVAC AND ELECTRICAL EQUIPMENT.
4.	PLUMBING CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS.
5.	ALL PLUMBING FIXTURES SHALL HAVE INDIVIDUAL SHUT-OFF VALVES.
6.	FLASH AND SEAL ALL ROOF PENETRATIONS TO MAKE WATERTIGHT.
7.	CHANGES IN DIRECTION IN DRAINAGE PIPING MUST BE MADE BY APPROPRIATE WYES AND BENDS. SANITARY TEES ARE NOT ALLOWED WHERE THE DIRECTION OF FLOW CHANGES FROM EITHER VERTICAL TO HORIZONTAL OR HORIZONTAL TO HORIZONTAL.

KEYNOTES	
1.	VERIFY PLUMBING REQUIREMENTS OF CRAC UNITS PRIOR TO INSTALLATION.
2.	VERIFY PLUMBING REQUIREMENTS OF AC-1 UNIT PRIOR TO INSTALLATION.



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*Donald D. Mavris*  
DONALD D. MAVRIS, PE  
DATE: 12.03.14 REG. NO.

DRAWN TITLE:  
PLUMBING ISOMETRICS

PROJECT:  
CONSTRUCT NEW IT CENTER  
FOR HEALTH CARE  
TECHNOLOGY MANAGEMENT  
EXPANSION

BLDG/CHAS	DESIGNED BY	DRAWN	CHECKED
NEW IT	JDM	AJF	

LOCATION:  
ST. CLOUD VA HCS  
ST. CLOUD, MN 56303

DRAWING:  
M202

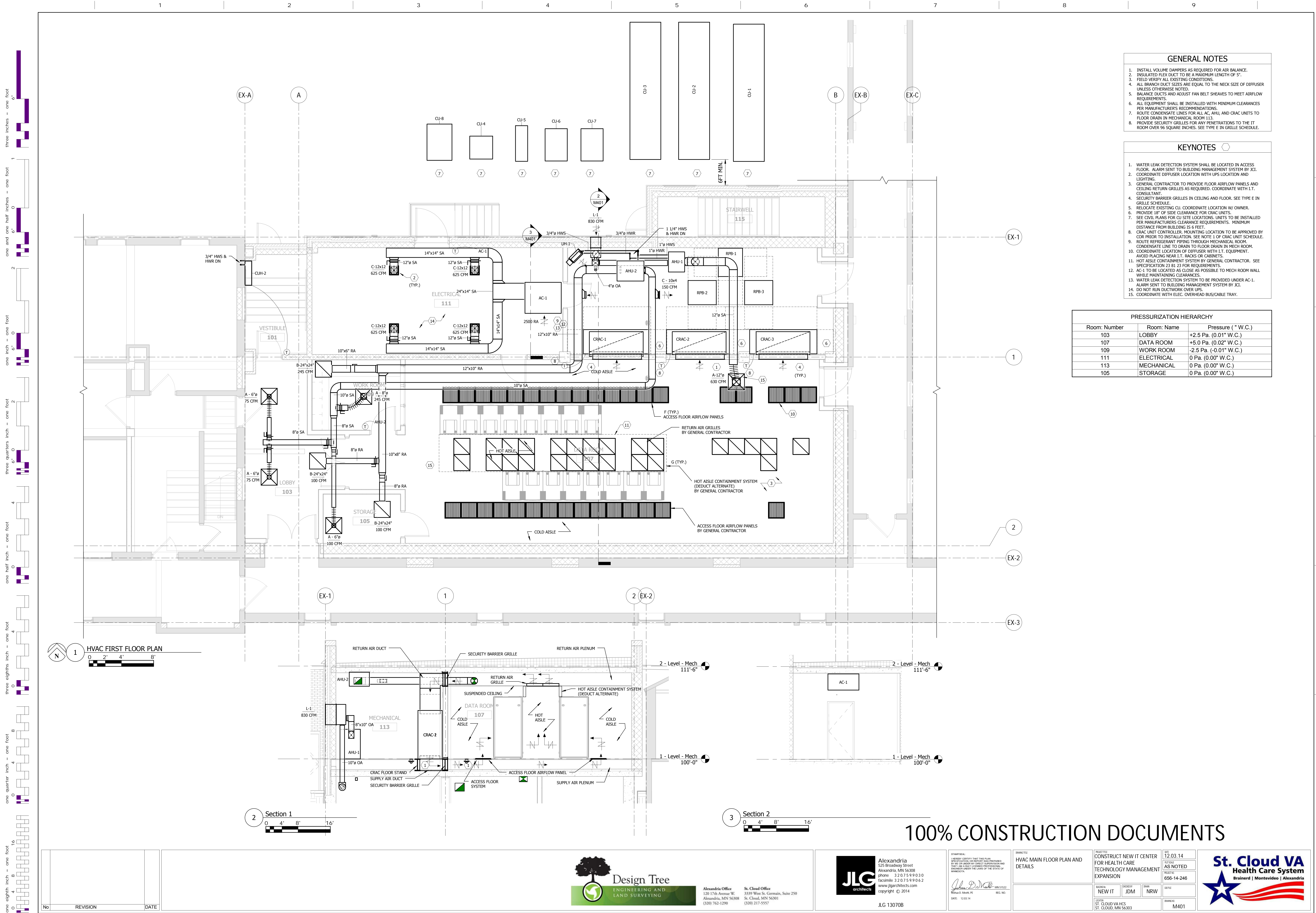
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PROJECT:  
656-14-246







GENERAL NOTES

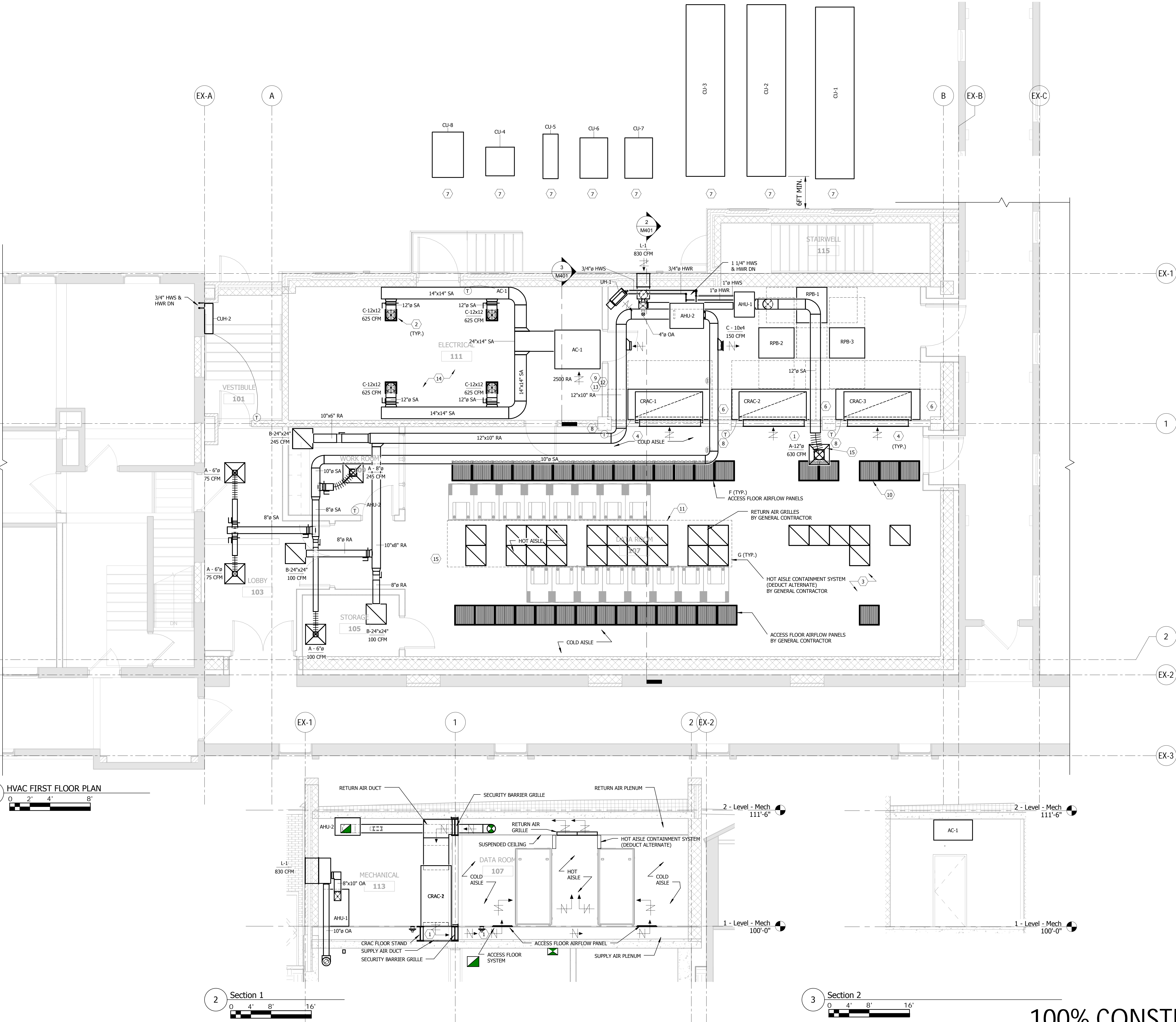
1. INSTALL VOLUME DAMPERS AS REQUIRED FOR AIR BALANCE.
2. INSULATED FLEX DUCT TO BE A MAXIMUM LENGTH OF 5'.
3. FIELD VERIFY ALL EXISTING CONDITIONS.
4. ALL BRANCH DUCT SIZES ARE EQUAL TO THE NECK SIZE OF DIFFUSER UNLESS OTHERWISE NOTED.
5. BALANCE DUCTS AND ADJUST FAN BELT SHEAVES TO MEET AIRFLOW REQUIREMENTS.
6. ALL EQUIPMENT SHALL BE INSTALLED WITH MINIMUM CLEARANCES PER MANUFACTURER'S RECOMMENDATIONS.
7. ROUTE CONDENSATE LINES FOR ALL AC, AHU, AND CRAC UNITS TO FLOOR DRAIN IN MECHANICAL ROOM 113.
8. PROVIDE SECURITY GRILLES FOR ANY PENETRATIONS TO THE IT ROOM OVER 96 SQUARE INCHES. SEE TYPE E IN GRILLE SCHEDULE.

KEYNOTES

1. WATER LEAK DETECTION SYSTEM SHALL BE LOCATED IN ACCESS FLOOR. ALARM SENT TO BUILDING MANAGEMENT SYSTEM BY JCL.
2. COORDINATE DIFFUSER LOCATION WITH UPS LOCATION AND LIGHTING.
3. GENERAL CONTRACTOR TO PROVIDE FLOOR AIRFLOW PANELS AND CEILING RETURN GRILLES AS REQUIRED. COORDINATE WITH I.T. CONSULTANT.
4. SECURITY BARRIER GRILLES IN CEILING AND FLOOR. SEE TYPE E IN GRILLE SCHEDULE.
5. RELOCATE EXISTING CU. COORDINATE LOCATION W/ OWNER.
6. PROVIDE 18" OF SIDE CLEARANCE FOR CRAC UNITS.
7. SEE CIVIL PLANS FOR CU SITE LOCATIONS. UNITS TO BE INSTALLED PER MANUFACTURER'S CLEARANCE REQUIREMENTS. MINIMUM DISTANCE FROM BUILDING IS 6 FEET.
8. CRAC UNIT CONTROLLER. MOUNTING LOCATION TO BE APPROVED BY COR PRIOR TO INSTALLATION. SEE NOTE 1 OF CRAC UNIT SCHEDULE.
9. ROUTE REFRIGERANT PIPING THROUGH MECHANICAL ROOM. CONDENSATE LINE TO DRAIN TO FLOOR DRAIN IN MECH ROOM.
10. COORDINATE LOCATION OF DIFFUSER WITH I.T. EQUIPMENT. AVOID PLACING NEAR I.T. RACKS OR CABINETS.
11. HOT AISLE CONTAINMENT SYSTEM BY GENERAL CONTRACTOR. SEE SPECIFICATION 23.81.23 FOR REQUIREMENTS.
12. AC-1 TO BE LOCATED AS CLOSE AS POSSIBLE TO MECH ROOM WALL WHILE MAINTAINING CLEARANCES.
13. WATER LEAK DETECTION SYSTEM TO BE PROVIDED UNDER AC-1. ALARM SENT TO BUILDING MANAGEMENT SYSTEM BY JCL.
14. DO NOT RUN DUCTWORK OVER UPS.
15. COORDINATE WITH ELEC. OVERHEAD BUS/CABLE TRAY.

PRESSURIZATION HIERARCHY

Room: Number	Room: Name	Pressure ( " W.C.)
103	LOBBY	+2.5 Pa. (0.01" W.C.)
107	DATA ROOM	+5.0 Pa. (0.02" W.C.)
109	WORK ROOM	-2.5 Pa. (-0.01" W.C.)
111	ELECTRICAL	0 Pa. (0.00" W.C.)
113	MECHANICAL	0 Pa. (0.00" W.C.)
105	STORAGE	0 Pa. (0.00" W.C.)



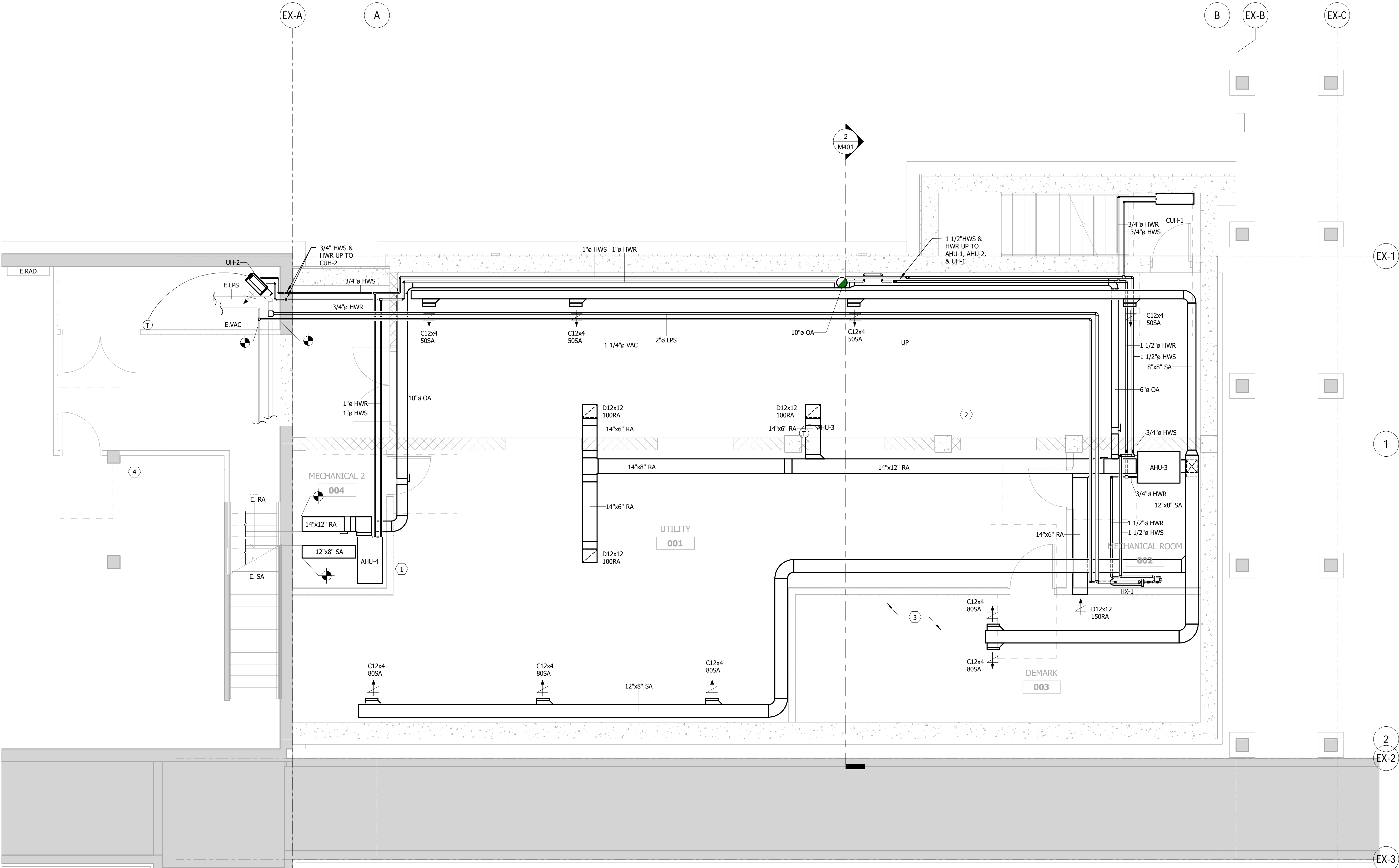


three inches = one foot  
one and one half inches = one foot  
one inch = one foot  
three quarters inch = one foot  
one half inch = one foot  
three eighths inch = one foot  
one quarter inch = one foot  
one eighth inch = one foot

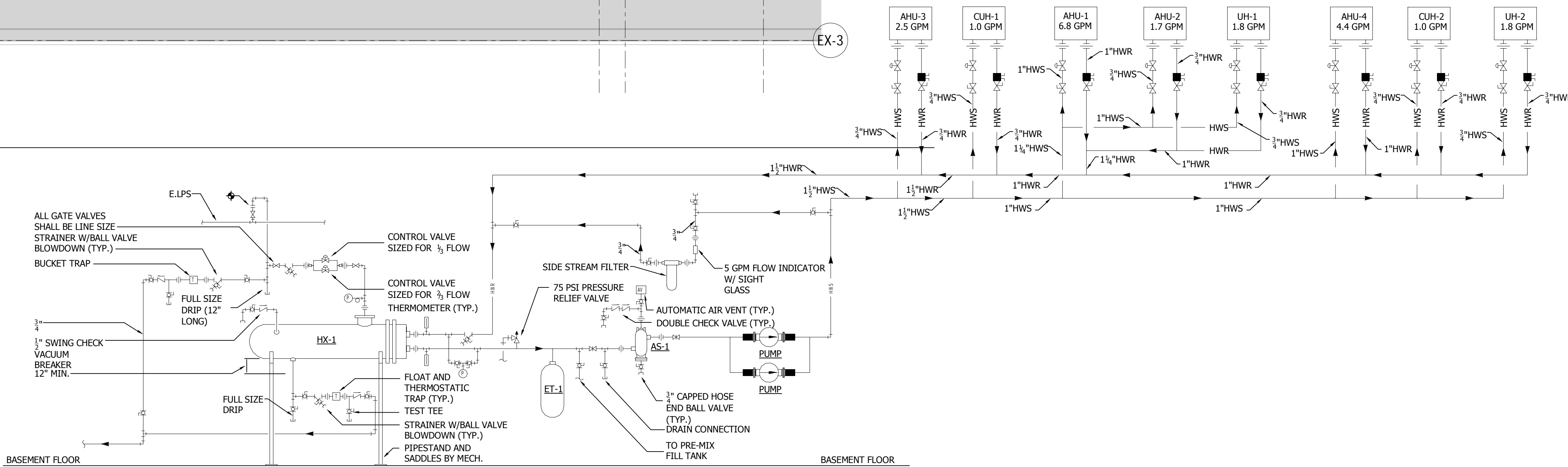
- GENERAL NOTES

  1. INSTALL VOLUME DAMPERS AS REQUIRED FOR AIR BALANCE.
  2. INSULATED FLEX DUCT TO BE A MAXIMUM LENGTH OF 5'.
  3. FIELD VERIFY ALL EXISTING CONDITIONS.
  4. ALL BRANCH DUCT SIZES ARE EQUAL TO THE NECK SIZE OF DIFFUSER UNLESS OTHERWISE NOTED.
  5. BALANCE DUCTS AND ADJUST FAN BELT SHEAVES TO MEET AIRFLOW REQUIREMENTS.
  6. FIELD VERIFY LOCATION OF EXISTING DUCTS. DEMO EXISTING RTU UNIT. MECHANICAL CONTRACTOR TO PROVIDE TEMPORARY COOLING TO SPIKE SERVEY UNIT. INSTALLATION AND STARTUP OF AHU-4. MINIMUM COOLING CAPACITY SHALL BE EQUIVALENT TO AHU-4. COORDINATE WITH CONTRACTOR.
- KEYNOTES

  1. TIE AHU-4 INTO EXISTING TEMPERATURE CONTROLS.
  2. COMBINATION HUMIDISTAT AND THERMOSTAT.
  3. COORDINATE DUCTWORK WITH CABLE TRANS.
  4. VERIFY LOCATION OF EXISTING MECHANICAL EQUIPMENT AND COORDINATE RELOCATION WITH ARCHITECT/ENGINEER.



1 HVAC BASEMENT PLAN  
0 2' 4' 8'



2 MECH-SCHEMATIC  
NO SCALE

100% CONSTRUCTION DOCUMENTS

REVISION

No	DATE
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BY ME OR UNDER MY DIRECT SUPERVISION AND  
I AM AN ENGINEER OR ARCHITECT REGISTERED  
ENGINEER UNDER THE LAWS OF THE STATE OF  
MINNESOTA.

DATE: 12.03.14 REG. NO.

DRAWING TITLE  
HVAC BASEMENT PLAN

PROJECT TITLE  
CONSTRUCT NEW IT CENTER  
FOR HEALTH CARE  
TECHNOLOGY MANAGEMENT  
EXPANSION

DATE: 12.03.14  
REVISED: AS NOTED  
PROJECT: 656-14-246

DESIGNED BY: JDM  
CHECKED BY: NRW  
DATE: 12.03.14

LOCATION  
ST. CLOUD VA HCS  
ST. CLOUD, MN 56303

DRAWING NO.  
M402

St. Cloud VA  
Health Care System  
Brainerd | Montevideo | Alexandria

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C

D

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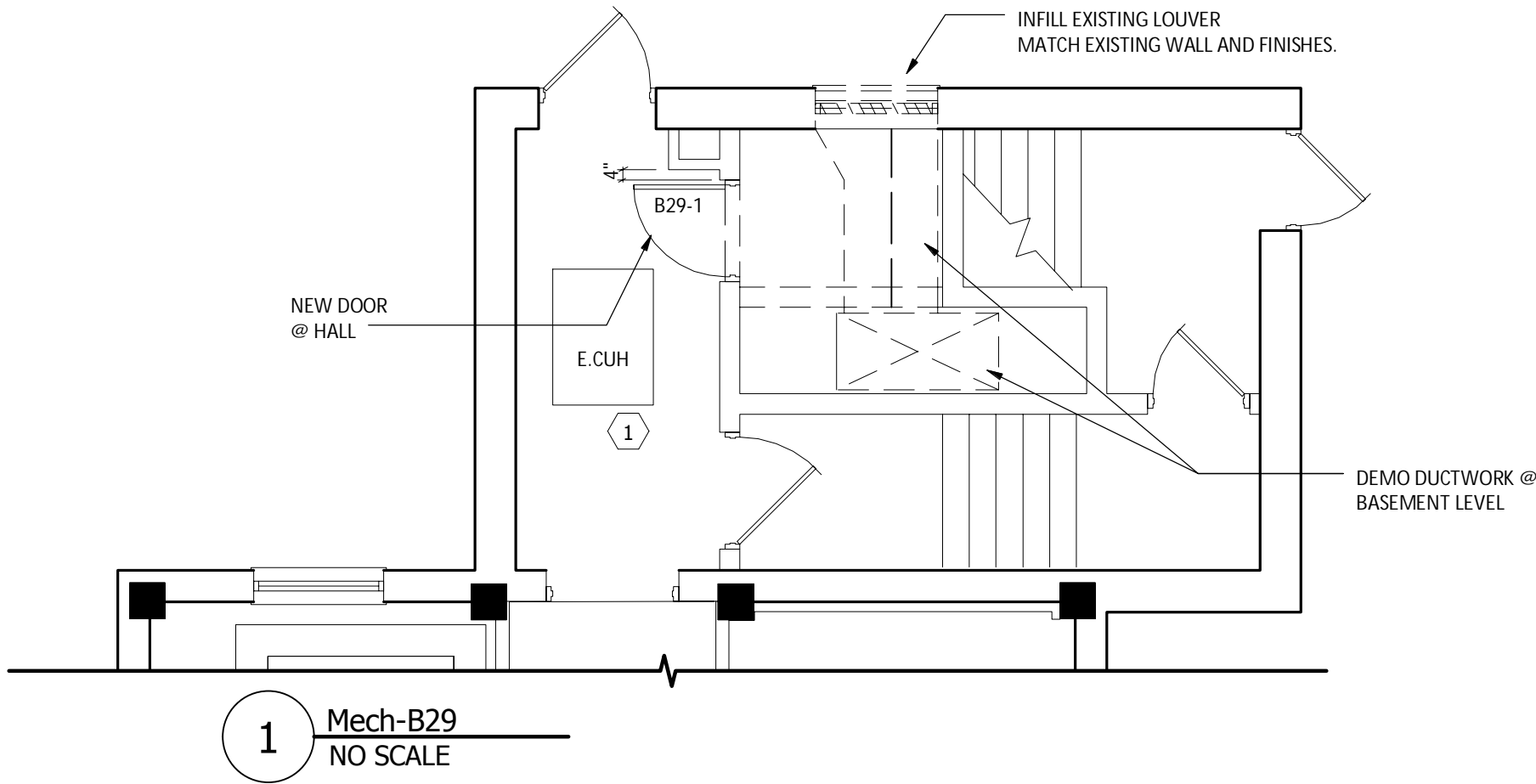
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KEYNOTES
1. RELOCATE E.C.U.H. COORDINATE FINAL LOCATION WITH IT/ELECTRICAL CONTRACTOR. E.C.U.H TO BE HUNG FROM CONCRETE DECK PER MANUFACTURER'S INSTRUCTIONS.



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DATE

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I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly licensed professional engineer under the laws of the state of Minnesota.

RONALD D. MAVRIS, PE

REG. NO. MN 51522

DATE: 12.03.14

DRAWN TITLE

HVAC B29 CORRIDOR

PROJECT FOR

CONSTRUCT NEW IT CENTER FOR HEALTH CARE TECHNOLOGY MANAGEMENT EXPANSION

BUILDING

NEW IT

DESIGNED BY

JDM

DRAWN

NRW

CHECKED

DATE

12.03.14

SCALE

M403

DATE

12.03.14

SCALE

M403

St. Cloud VA Health Care System

Brainerd | Montevideo | Alexandria

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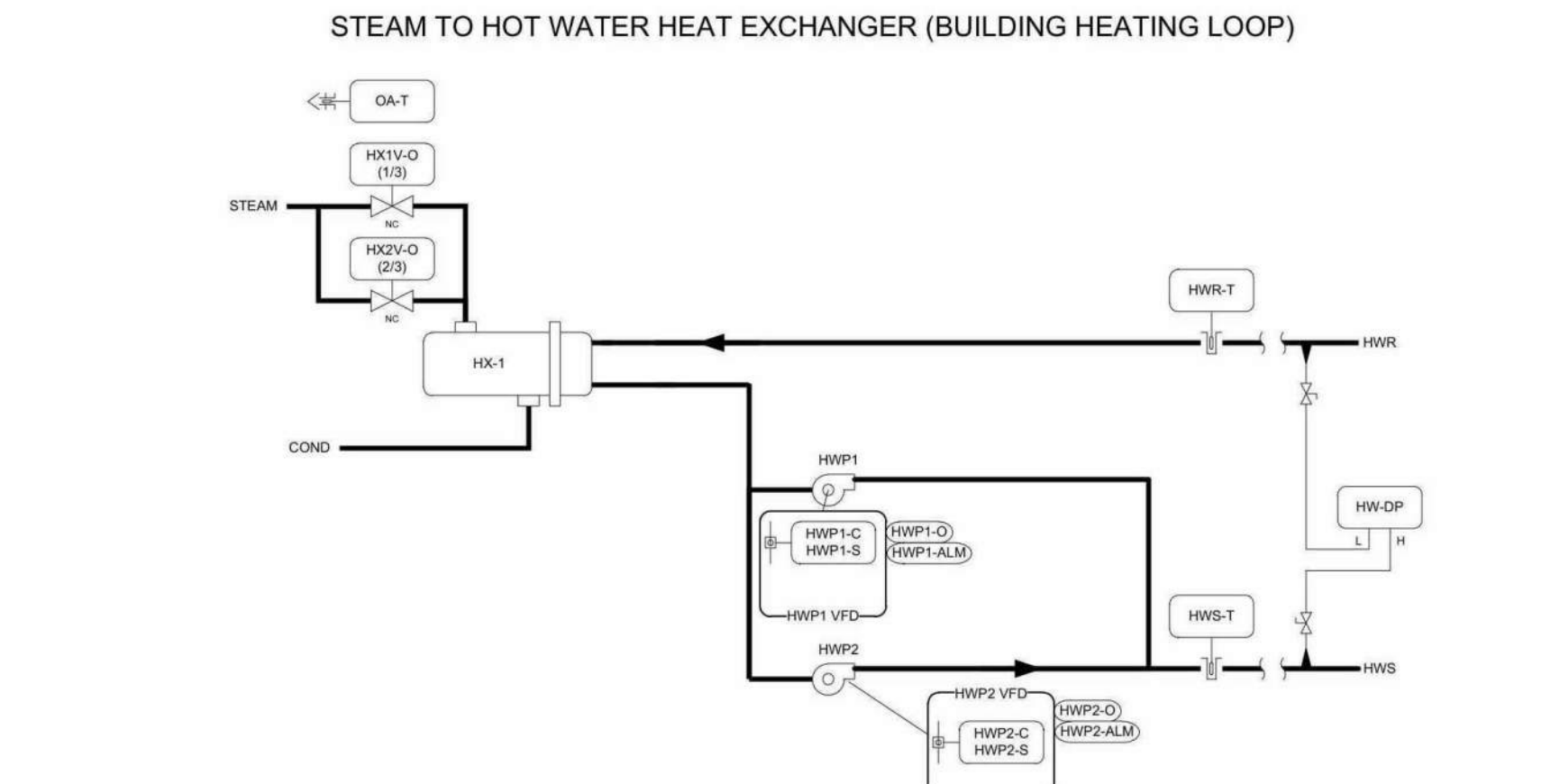
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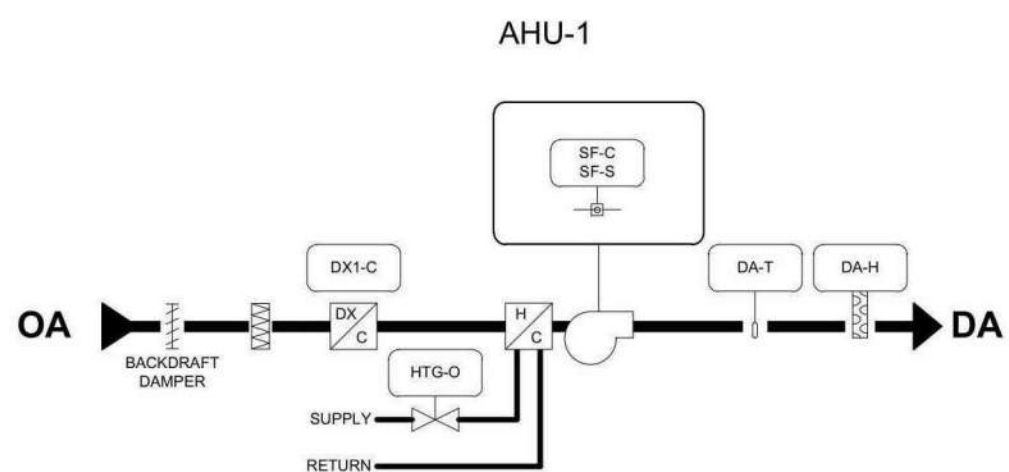




#### STEAM TO HOT WATER HEAT EXCHANGER - BUILDING HEATING LOOP - SEQUENCE OF OPERATION

- A. SYSTEM ENABLE:** The heating system will automatically start when the system enable is "ON" and the outside air temperature falls below the system enable setpoint of 70 deg F (adj). When the system enable is "OFF" or the outside air temperature rises above this setpoint, the heating system will be disabled.
- B. HEAT EXCHANGER CONTROL:** This system consists of one steam heat exchanger (HX). The unit will have two sequenced steam inlet valves that will modulate in sequence (1/3 valve followed by the 2/3 valve) to maintain the desired hot water supply temperature to setpoint as reset by the outdoor air temperature (OA-T=0 deg F HWS-T=200 deg F / OA-T=60 deg F HWS-T=140 deg F - fully adjustable). The steam valves will not be allowed to operate unless the system enable is on and pump status is proven.
- C. HOT WATER PUMP CONTROL:** When enabled, the lead pump (pump with the lowest runtime) will be started. If the pump status does not match the command or the pump Amps exceed normal limits, a "PUMP FAILURE" alarm will be generated and the lag pump will be started. Upon loss of status, the pump will restart after the system reset is activated. Pumps will be rotated every 1000 hours (adj) to ensure equal runtime.
- D. LOOP PRESSURE CONTROL:** When a pump status is verified, the pump will modulate to maintain the system differential pressure of the system.

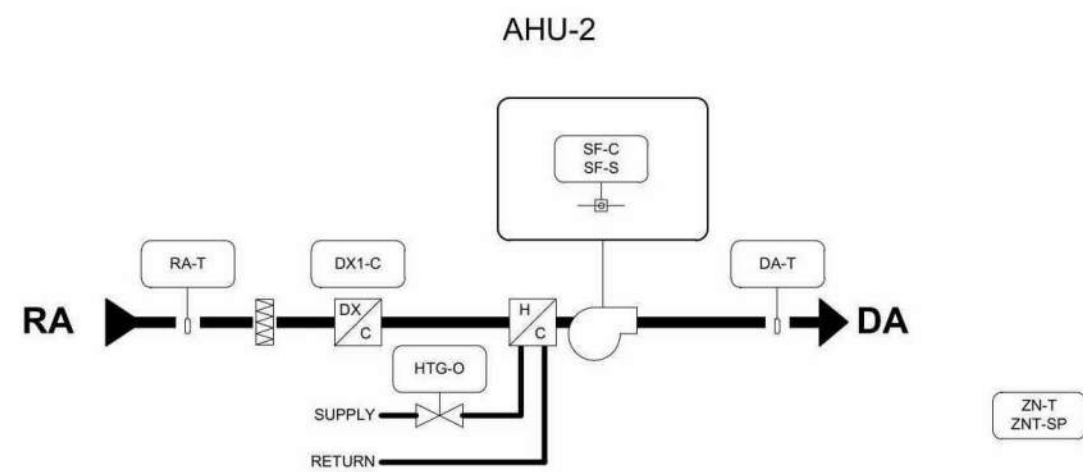
TAG	DESCRIPTION	TYPE	ALARM	GRAPHIC	TREND	NOTES
HX1V-O	1/3 Heat Exchanger - Valve Output	AO		X	X	1/3 Capacity Valve
HX2V-O	2/3 Heat Exchanger - Valve Output	AO		X	X	2/3 Capacity Valve
OA-T	Outdoor Air Temperature	AI		X	X	
HWP1-C	Hot Water Pump (P-1) Command	BO	X	X	X	Lead / VFD
HWP1-O	Hot Water Pump (P-1) Speed Output	AO		X	X	Lead / VFD
HWP1-S	Hot Water Pump (P-1) Status	BI		X	X	Lead / VFD
HWP1-ALM	Hot Water Pump (P-1) VFD Alarm	BI	X	X	X	Lead / VFD
HWP2-C	Hot Water Pump (P-2) Command	BO	X	X	X	Standby / VFD
HWP2-O	Hot Water Pump (P-2) Speed Output	AO		X	X	Standby / VFD
HWP2-S	Hot Water Pump (P-2) Status	BI		X	X	Standby / VFD
HWP2-ALM	Hot Water Pump (P-2) VFD Alarm	BI	X	X	X	Standby / VFD
HW-DP	Hot Water Differential Pressure	AI	X	X	X	
HWST-SP	HW Supply Temp Setpoint (Call)	AD		X	X	
OAT-HL	Outdoor Air Temp Reset Hi Limit	AD		X		
OAT-LL	Outdoor Air Temp Reset Lo Limit	AD		X		
HWST-HL	HW Supply Temp Hi Limit	AD		X		
HWST-LL	HW Supply Temp Lo Limit	AD		X		
HWR-T	Hot Water Return Temp	AI		X	X	
HWS-T	Hot Water Supply Temp	AI	X	X	X	



#### AIR HANDLING UNIT (AHU-1) - SEQUENCE OF OPERATION

- A. SUPPLY FAN CONTROL:** The constant speed supply fan will be started and will run continuously to maintain space pressure. The supply fan status will be monitored and alarm will be displayed at the user interface if the status does not match the fan command. The speed of the fan will be manually balanced to maintain the pressure relationship in the spaces served. The space pressure will not be monitored by the BAS.
- B. TEMPERATURE CONTROL:** In the heating mode, the re-heat coil valve will modulate to maintain the discharge air temperature at setpoint. The setpoint will be set equal to zone temperature setpoint of the CRAC units (adj). If the CRAC units are in the cooling mode, the discharge air temperature setpoint will be limited to 50 deg F (adj). In the cooling mode, the DX cooling coil will be cycled to maintain the space temperature setpoint. The setpoint will be set equal to zone temperature setpoint of the CRAC units (adj).
- C. DEHUMIDIFICATION MODE:** If the CRAC units are in dehumidification mode OR the outdoor air enthalpy is above .013 lbw/lbda (adj) with an outdoor air temperature above 75 deg F, the DX cooling coil will be ON. In this mode, the reheat will be allowed to reheat the discharge air as needed.
- D. OCCUPIED / UNOCCUPIED MODE:** The unit will run continuously.
- E. UNIT SHUTDOWN:** If the CRAC unit low humidity alarm is activated OR space humidity is below 15%RH, the unit will be shut down and an alarm will be displayed at the user interface. If the CRAC unit high humidity alarm is activated OR the space humidity is above 90%, the unit will be shut down and an alarm will be displayed at the user interface.

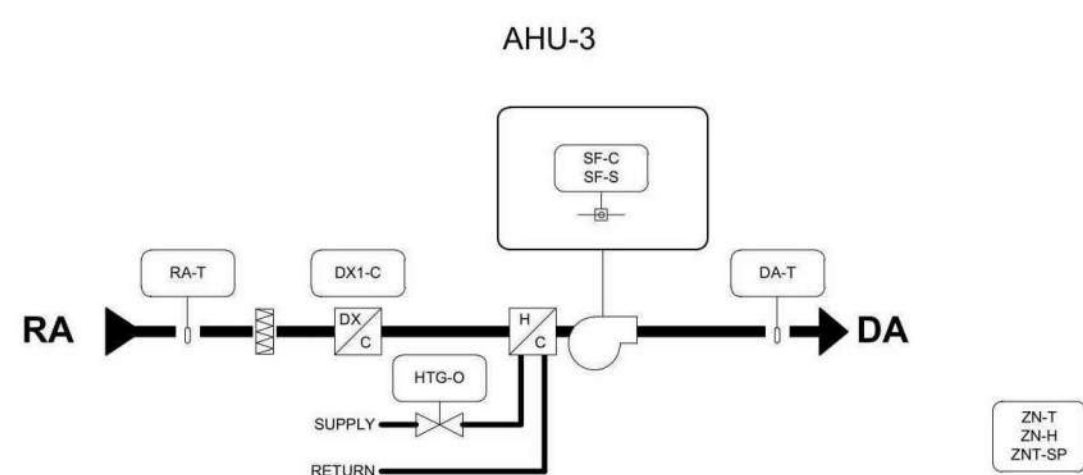
TAG	DESCRIPTION	TYPE	ALARM	GRAPHIC	TREND	NOTES
DA-T	Discharge Air Temperature	AI	X	X	X	
DA-T-SP	Discharge Air Temperature Setpoint	AD		X	X	
DA-H	Discharge Air Humidity	AI	X	X	X	
ZN-T	Zone Temperature	BACnet		X	X	From Integration with CRAC units
ZN-T-SP	Zone Temperature Setpoint	AD		X	X	
ZN-H	Zone Humidity	BACnet		X	X	From Integration with CRAC units
SF-C	Supply Fan Command	BO	X	X	X	
SF-S	Supply Fan Status	BI		X	X	
DX1-C	DX Cooling Command	BO		X	X	
HTG-O	Heating Valve Control	AO		X	X	



#### AIR HANDLING UNIT (AHU-2) - SEQUENCE OF OPERATION

- A. SUPPLY FAN CONTROL:** The constant speed supply fan will be started and will run continuously to maintain space temperature. The supply fan status will be monitored and alarm will be displayed at the user interface if the status does not match the fan command.
- B. TEMPERATURE CONTROL:** The unit will control to maintain the zone temperature setpoint of 72 degrees F (adj).
- C. DISCHARGE and RETURN AIR TEMP SENSOR:** a discharge air and return air temp sensor is provided on the unit for monitoring purposes.
- D. OCCUPIED MODE:** The unit will run continuously to maintain occupied temperature setpoint.
- E. UNOCCUPIED MODE:** The unit will cycle to maintain the unoccupied temperature setpoints of 65 degrees F (heating - adj) and 80 degrees F (cooling - adj).
- F. COOLING COIL:** The DX cooling coil will be cycled to maintain temperature setpoint. When the unit is shutdown, the cooling coil will be off. Upon a loss of airflow, the cooling coil will be off.
- G. REHEAT COIL:** When the system is calling for heat the heating coil valve will modulate to maintain the space temperature setpoint. When the unit is shutdown or there is a loss of fan status the reheat coil valve will be closed.

TAG	DESCRIPTION	TYPE	ALARM	GRAPHIC	TREND	NOTES
DA-T	Discharge Air Temperature	AI	X	X	X	
RA-T	Return Air Temperature	AD		X	X	
ZNT-SP	Zone Temperature Setpoint	AD		X	X	
ZN-T	Zone Temperature	AI		X	X	
SF-C	Supply Fan Command	BO	X	X	X	
SF-S	Supply Fan Status	BI		X	X	
DX1-C	DX Cooling Command	BO		X	X	
HTG-O	Heating Valve Control	AO		X	X	

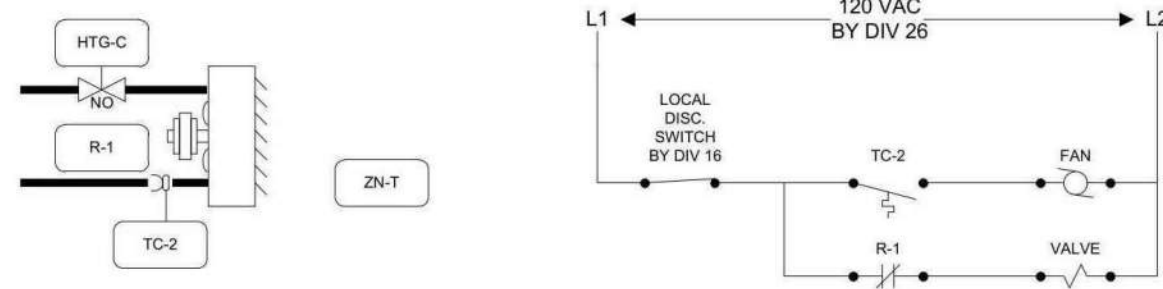


#### AIR HANDLING UNIT (AHU-3) - SEQUENCE OF OPERATION

- A. SUPPLY FAN CONTROL:** The constant speed supply fan will be started and will cycle to maintain space temperature and humidity. The supply fan status will be monitored and alarm will be displayed at the user interface if the status does not match the fan command.
- B. TEMPERATURE and HUMIDITY CONTROL:** The unit will control to maintain the zone temperature setpoint of 68 degrees F (adj) and a zone humidity setpoint of 50%RH (adj).
- C. DISCHARGE and RETURN AIR TEMP SENSOR:** a discharge air and return air temp sensor is provided on the unit for monitoring purposes.
- D. OCCUPIED/UNOCCUPIED MODE:** The unit will cycle to maintain occupied temperature and humidity setpoints.
- E. COOLING COIL:** The DX cooling coil will be cycled to maintain space temperature setpoint and space humidity setpoint. When the unit is shutdown, the cooling coil will be off. Upon a loss of airflow, the cooling coil will be off.
- F. REHEAT COIL:** When the system is calling for heat, the heating coil valve will modulate to maintain the space temperature setpoint. When the unit is shutdown or there is a loss of fan status the reheat coil valve will be closed.

TAG	DESCRIPTION	TYPE	ALARM	GRAPHIC	TREND	NOTES
DA-T	Discharge Air Temperature	AI	X	X	X	
RA-T	Return Air Temperature	AD		X	X	
ZNT-SP	Zone Temperature Setpoint	AD		X	X	
ZN-T	Zone Temperature	AI		X	X	
ZN-H	Zone Humidity	AI	X	X	X	
SF-C	Supply Fan Command	BO	X	X	X	
SF-S	Supply Fan Status	BI		X	X	
DX1-C	DX Cooling Command	BO		X	X	
HTG-O	Heating Valve Control	AO		X	X	

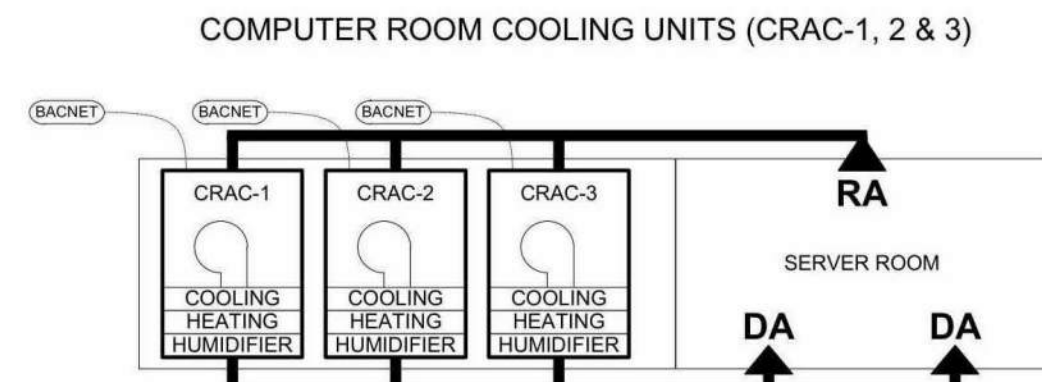
#### UNIT HEATER / CABINET UNIT HEATER



#### UNIT HEATER (UH-1, UH-2, CUH-1, & CUH-2) - SEQUENCE OF OPERATION

- A. SUPPLY FAN CONTROL:** The constant speed supply fan will run any time there is a call for heating. The supply fan will not be allowed to run until an aqua stat senses hot water is available in the heating coil.
- B. TEMPERATURE CONTROL:** The unit will control to maintain the zone temperature setpoint as sensed by the zone temperature sensor.
- C. HEATING COIL:** The heating coil control valve will be open on a call for heat to maintain the temperature setpoint.

TAG	DESCRIPTION	TYPE	ALARM	GRAPHIC	TREND	NOTES
HTG-C	Heating Valve Command (On/Off)	BO		X	X	Also commands the fan to run
ZNT-SP	Zone Temperature Setpoint	AD		X	X	
ZN-T	Zone Temperature	AI	X	X	X	

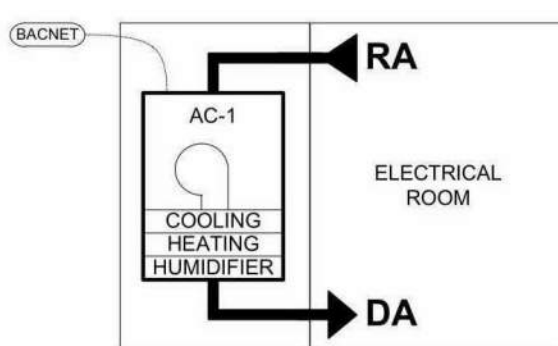


#### COMPUTER ROOM COOLING UNITS - SEQUENCE OF OPERATION

- A. FACTORY CONTROLS:** The unit's factory controls will operate the unit to maintain the space conditions in the server room (75 deg F - adj from 64 deg F to 75 deg F / 50%RH - adj from 30% to 55%). Setpoint adjustments shall only be made at the local equipment interface.
- B. BACNET INTERFACE:** The unit will come from the factory with a BACnet interface card to communicate to the Building Automation System. Through this connection, the BAS operator will be allowed to view system conditions (alarms, status, temperatures, etc). All points that are viewable are dependent upon the configuration of the unit from the factory.

TAG	DESCRIPTION	TYPE	ALARM	GRAPHIC	TREND	NOTES
ZN-T	Zone Temperature	BACnet	X	X	X	VIEW ONLY - via BACnet Interface
ZNT-SP	Zone Temperature Setpoint	BACnet		X	X	VIEW ONLY - via BACnet Interface
ZN-H	Zone Humidity	BACnet	X	X	X	VIEW ONLY - via BACnet Interface
ZNH-SP	Zone Humidity Setpoint	BACnet		X	X	VIEW ONLY - via BACnet Interface
MISC COND	Miscellaneous System Conditions	BACnet	X		varies	VIEW ONLY - via BACnet Interface
MISC ALARMS	Miscellaneous System Alarms	BACnet	X	X	varies	VIEW ONLY - via BACnet Interface

#### ELECTRICAL ROOM AC UNIT (AC-1)



#### ELECTRICAL ROOM AIR CONDITIONING UNIT - SEQUENCE OF OPERATION

- A. FACTORY CONTROLS:** The unit's factory controls will operate the unit to maintain the space conditions in the server room (75 deg F - adj from 64 deg F to 75 deg F / 50%RH - adj from 30% to 55%). Setpoint adjustments shall only be made at the local equipment interface.
- B. BACNET INTERFACE:** The unit will come from the factory with a BACnet interface card to communicate to the Building Automation System. Through this connection, the BAS operator will be allowed to view system conditions (alarms, status, temperatures, etc). All points that are viewable are dependent upon the configuration of the unit from the factory.

TAG	DESCRIPTION	TYPE	ALARM	GRAPHIC	TREND	NOTES
ZN-T	Zone Temperature	BACnet	X	X	X	VIEW ONLY - via BACnet Interface
ZNT-SP	Zone Temperature Setpoint	BACnet		X	X	VIEW ONLY - via BACnet Interface
ZN-H	Zone Humidity	BACnet	X	X	X	VIEW ONLY - via BACnet Interface
ZNH-SP	Zone Humidity Setpoint	BACnet		X	X	VIEW ONLY - via BACnet Interface
MISC COND	Miscellaneous System Conditions	BACnet	X		varies	VIEW ONLY - via BACnet Interface
MISC ALARMS	Miscellaneous System Alarms	BACnet	X	X	varies	VIEW ONLY - via BACnet Interface

#### UPS MONITORING POINTS

#### UPS MONITOR POINTS - SEQUENCE OF OPERATION

- A. MISCELLANEOUS ALARMS:** If any alarm point goes into an 'alarm' state, an alarm will be generated in the system and displayed on the user interface.

TAG	DESCRIPTION	TYPE	ALARM	GRAPHIC	TREND	NOTES
ACINFAIL-A	Input AC Power Source Failure Alarm	BI	X	X	X	via dry contact from UPS System
INPD-OPEN	Input Protective Device Open	BI	X	X	X	via dry contact from UPS System
OUTPD-OPEN	Output Protective Device Open	BI	X	X	X	via dry contact from UPS System
OVERLOAD-A	System Overload Alarm	BI	X	X	X	via dry contact from UPS System
OLSHDN-A	System Overload Shutdown Alarm	BI	X	X	X	via dry contact from UPS System
DCOVERVOLT-A	DC Overvoltage Alarm	BI	X	X	X	via dry contact from UPS System
DCGND-FAULT	DC Ground Fault	BI	X	X	X	via dry contact from UPS System
BATT-LOW	Low Battery Alarm	BI	X	X	X	via dry contact from UPS System
BATT-DISCH	Battery Discharged Alarm	BI	X	X	X	via dry contact from UPS System
CLGFAN-FAIL	Cooling Fan Failure	BI	X	X	X	via dry contact from UPS System
OVERTEMP-A	Equipment Overtemperature Alarm	BI	X	X	X	via dry contact from UPS System
CTLPOWER-FAIL	Control Power Failure	BI	X	X	X	via dry contact from UPS System
CHARGER-OFF	Charger Off	BI	X	X	X	via dry contact from UPS System
INVERTER-OFF	Inverter Off	BI	X	X	X	via dry contact from UPS System
EMERGENCY-OFF	Emergency Off	BI	X	X	X	via dry contact from UPS System
UPSonBATT	UPS running on Battery	BI	X	X	X	via dry contact from UPS System
LOADonBYP	Load on Static Bypass	BI	X	X	X	via dry contact from UPS System
BYDISABLE-A	Static Bypass Transfer Switch Disabled Alarm	BI	X	X	X	via dry contact from UPS System
INVERTER-A	Inverter Output Alarm	BI	X	X	X	via dry contact from UPS System
BYPASS-A	Bypass Source Alarm	BI	X	X	X	via dry contact from UPS System
BS2ISYNC-A	Bypass Source to Inverter Out of Sync Alarm	BI	X	X	X	via dry contact from UPS System

#### MISCELLANEOUS MONITORING POINTS

#### MISCELLANEOUS MONITOR POINTS - SEQUENCE OF OPERATION

- A. MISCELLANEOUS ALARMS:** If any alarm point goes into an 'alarm' state, an alarm will be generated in the system and displayed on the user interface.

TAG	DESCRIPTION	TYPE	ALARM	GRAPHIC	TREND	NOTES
SP1-A	Sump Pump 1 Operating Alarm	BI	X	X	X	via dry contact from SP-1
SP1HW-A	Sump Pump 1 High Water Alarm	BI	X	X	X	via dry contact from SP-1
SP2-A	Sump Pump 2 Operating Alarm	BI	X	X	X	via dry contact from SP-2
SP2HW-A	Sump Pump 2 High Water Alarm	BI	X	X	X	via dry contact from SP-2
CWSHDN1-S	Cold Water Shut-off Valve Status - Rm 001-1	BI	X	X	X	via Valve Tamper Switch
CWSHDN2-S	Cold Water Shut-off Valve Status - Rm 113	BI	X	X	X	via Valve Tamper Switch
CRAC1-LEAK	CRAC-1 Leak Detection Alarm	BI	X	X	X	via dry contact from Leak Detector
CRAC2-LEAK	CRAC-2 Leak Detection Alarm	BI	X	X	X	via dry contact from Leak Detector
CRAC3-LEAK	CRAC-3 Leak Detection Alarm	BI	X	X	X	via dry contact from Leak Detector
AC1-LEAK	AC-1 Leak Detection Alarm	BI	X	X	X	via dry contact from Leak Detector

1 MECH- FLOW SCHEMATIC  
NO SCALE

No	REVISION	DATE

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SPECIFICATION OR REPORT WAS PREPARED  
BY AN ENGINEER OR ARCHITECT REGISTERED AND  
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MINNESOTA

DATE: 12.03.14

FLOW SCHEMATIC

PROJECT  
CONSTRUCT NEW IT CENTER  
FOR HEALTH CARE  
TECHNOLOGY MANAGEMENT  
EXPANSION

DATE: 12.03.14

AS NOTED  
REVISIONS  
656-14-246

DESIGNED BY: JDM  
CHECKED BY: JDM  
DRAWN BY: NRW  
DATE: 12.03.14

SCALE: M601





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COMPUTER ROOM AIR CONDITIONING (CRAC) UNIT SCHEDULE

UNIT TAG	MFGR.	MODEL	SUPPLY AIR (CFM)	SUPPLY FAN QUANTITY	TOTAL SUPPLY FAN HP	MINIMUM OUTDOOR AIR (CFM)	FILTRATION	TOTAL COOLING CAPACITY (MBH)	SENSIBLE COOLING CAPACITY (MBH)	EAT (*F db/*F WB)	LAT (*F db/*F WB)	REHEAT CAPACITY (MBH)	REHEAT SOURCE	HUMIDIFIER CAPACITY (LB/HR)	V/PH/HZ	FLA	MOP	DISCONNECT PROVIDED BY	STARTER PROVIDED BY	DIMENSIONS (LxWxH)	WEIGHT (LBS)	NOTES
CRAC-1	LIEBERT	DA080DP1CDHE1C110-AP	9,600	2	4.6 KW	0	MERV13	256	229	75/61.1		51	ELEC	22	460/3/60	59.6	80	MECHANICAL	MECHANICAL	99x33x96	2200	1,2,3,4,5,6,7,8,9,10,11
CRAC-2	LIEBERT	DA080DP1CDHE1C110-AP	9,600	2	4.6 KW	0	MERV13	256	229	75/61.1		51	ELEC	22	460/3/60	59.6	80	MECHANICAL	MECHANICAL	99x33x96	2200	1,2,3,4,5,6,7,8,9,10,11
CRAC-3	LIEBERT	DA080DP1CDHE1C110-AP	9,600	2	4.6 KW	0	MERV13	256	229	75/61.1		51	ELEC	22	460/3/60	59.6	80	MECHANICAL	MECHANICAL	99x33x96	2200	1,2,3,4,5,6,7,8,9,10,11
NOTES:																						
1. PROVIDE MANUFACTURER SUPPLIED CONTROLLER FOR EACH CRAC UNIT. EACH CONTROLLER SHALL BE INSTALLED PER MANUFACTURER'S WRITTEN INSTRUCTIONS AND RECOMMENDATIONS. MOUNTING LOCATION TO BE APPROVED BY COR.																						
2. PROVIDE MANUFACTURER SUPPLIED NETWORK CARD TO COMMUNICATED WITH BUILDING AUTOMATION SYSTEM. VERIFY PROTOCOL TO BE USED WITH COR.																						
3. RUN 2 CANBUS CABLES FROM EACH CRAC CONTROLLER TO AN 8-PORT NETWORK SWITCH TO ENABLE UNIT-TO-UNIT COMMUNICATION. UNITS TO OPERATE IN TEAMWORK MODE WITH LEAD/LAG FUCTIONS.																						
4. CANBUS COMMUNICATION CABLE NEEDS TO RUN FROM CRAC TO ASSOCIATED CONDENSING UNIT AND THEN TO RPB UNIT. COMMUNICATION CABLE NOT TO BE RUN THROUGH CONDUIT CONTAINING CONDUCTORS OF A DIFFERENT VOLTAGE.																						
5. PROVIDE LEAK DETECTION CABLE TO BE LOCATED UNDER THE RAISED FLOOR AND AROUND EACH UNIT. LEAK ALARM TO BE REPORTED TO BUILDING AUTOMATION SYSTEM.																						
6. PROVIDE 36" MANUFACTURE SUPPLIED TOP PLENUM WITH DUCT COLLAR (DEDUCT ALTERNATE).																						
7. PROVIDE 15" FLOOR STAND. VERIFY ACCESS FLOOR HEIGHT WITH ARCHITECTURAL DRAWINGS PROIOR TO BID.																						
8. VERIFY REFRIGERANT LINE SIZES WITH MANUFACTURE PRIOR TO INSTALLATION.																						
9. PROVIDE MANUFACTURE SUPPLIED SUPPLY AIR TEMPERATURE SENSOR. LOCATE SENSOR PER MANUFACTURER'S RECOMMENDATIONS. ONE SENSOR PER CRAC.																						
10. PROVIDE MANUFACTURE SUPPLIED REMOTE 2T SERVER RACK TEMPERATURE SENSORS. PROVIDE ONE SENSOR FOR EACH CABINET AND RACK. COORDINATE INSTALLATION WITH COR. SENSOR READINGS TO BE EXPORTED TO BUILDING AUTOMATION SYSTEM.																						
11. PROVIDE ONE EXTRA HUMIDIFIER PAN PER CRAC UNIT.																						

PLUMBING FIXTURE SCHEDULE

P-NUMBER	DESCRIPTION	W/FU	CW SFU	HW SFU	TOTAL SFU	WASTE PIPE SIZE	VENT PIPE SIZE	CW PIPE SUPPLY SIZE	HW PIPE SUPPLY SIZE
801	WALL HYDRANT	-	-	-	-	-	-	0.75	-
804	HOSE BIBB	-	-	-	-	-	-	0.75	-
NOTES:									
1. PLUMBING FIXTURES ARE DESCRIBED IN MASTER SPECIFICATION 22 40 00, PLUMBING FIXTURES (PLUMBING FIXTURES AND TRIM).									

SCHEDULE OF FLOOR DRAINS

AREA:	TYPE	SIZE	NOTES
MECHANICAL EQUIPMENT ROOM	B	4"	1,2
NOTES:			
1. SEE MASTER SPECIFICATION 22 13 00, FACILITY SANITARY SEWERAGE FOR FLOOR DRAIN DESCRIPTIONS.			
2. PROVIDE BARRIER-TYPE TRAP SEAL MIFAB MI-GARD OR SIMILAR.			

AIR SEPARATOR SCHEDULE

UNIT TAG	MFGR.	MODEL	MAXIMUM FLOWRATE (GPM)	CONNECTION SIZE
AS-1	BELL & GOSSETT	EASB-1-1	19.8	1.5"
NOTES:				
1. AIR SEPARATOR SHALL HAVE AN INTERNAL STRAINER				

LOUVER SCHEDULE

UNIT TAG	LOCATION	SERVES	MFGR.	MODEL	CFM	FRAME SIZE (WxH)	FREE AREA (SQFT)	VELOCITY (FPM)	BPWP (FPM)	PRESSURE (IN WG)
L-1	MECH 113	AHU-1,2,3,4	GREENHECK	ES1-401	830	15x30	1.34	621	691	0.069
NOTES:										
1. VERIFY LOUVER FINISH WITH ARCHITECT.										
2. PROVIDE VIRTICAL SECURITY BAR ASSEMBLY WITH MINIMUM 1/2" DIAMETER RODS.										

PUMP SCHEDULE

UNIT TAG	LOCATION	SERVES	MFGR.	MODEL	FLOW RATE (GPM)	TOTAL HEAD (FT WC)	FLUID TYPE	RPM	V/PH	VARIABLE SPEED	HORSE POWER	DISCONNECT PROVIDED BY	STARTER PROVIDED BY	NOTES
P-1	MECH 002	HW LOOP	BELL & GOSSETT	ECOCIRC XL 20-35	19.8	10	50% PG	1500-4500	115V/1PH	Y	0.08	ELECTRICAL	MECHANICAL	1
P-2	MECH 002	HW LOOP	BELL & GOSSETT	ECOCIRC XL 20-35	19.8	10	50% PG	1500-4500	115V/1PH	Y	0.08	ELECTRICAL	MECHANICAL	1
NOTES:														
1. PUMPS MOTORS TO BE SINGLE PHASE, VARIABLE SPEED, ELECTRONICALLY COMMUTAED, WITH FACTORY-PROVIDED ELECTRONIC DRIVE.														

AIR HANDLING UNIT SCHEDULE

UNIT TAG	SERVES	LOCATION	MFGR.	MODEL	SUPPLY AIR(CFM)	MINIMUM OUTDOOR AIR (CFM)	ESP (IN. W.C.)	SUPPLY FAN HP	FILTRATION	COOLING CAPACITY (MBH)	EAT (*F db/*F WB)	LAT (*F db/*F WB)	HEAT SOURCE	HEAT CAPACITY (MBH)	EAT (*F)	LAT (*F)	V/PH/HZ	MCA	MOP	DISCONNECT PROVIDED BY	STARTER PROVIDED BY	DIMENSIONS (LxWxH)	WEIGHT (LBS)	NOTES
AHU-1	DATA 107	MECH 113	ENVIRO-TEC	H08	630	0.25	0.25	1/3	MERV 7 & 14	58.6	90/80	55/54	50% PG	69.5	-30	72	460/3/60	1.00	15	MECHANICAL	MECHANICAL	40x30x21	242	1,4
AHU-2	WORKROOM 109	MECH 113	ENVIRO-TEC	H08	600	55	0.40	1/3	MERV 7 & 14	20.8	77/65	54/53	50% PG	21.7	58	91	460/3/60	1.00	15	MECHANICAL	MECHANICAL	40x30x21	220	2,4
AHU-3	UTILITY 001	MECH 002	ENVIRO-TEC	H08	600	150	0.45	1/3	MERV 7 & 14	25.6	79/67	54/53	50% PG	27.3	47	89	460/3/60	1.00	15	MECHANICAL	MECHANICAL	40x30x21	220	4
AHU-4	MECH	MECH 004	ENVIRO-TEC	V16	1,500	320	0.75	3/4	MERV 7 & 14	54.8	80/67	57/55	50% PG	44.0	50	77	460/3/60	1.75	15	MECHANICAL	MECHANICAL	24x44x44	293	3,4
NOTES:																								
1. PROVIDE VFD. BALANCE SUPPLY AIR FLOW SETPOINT TO BE 300 CFM. ADJUST TO PROVIDE POSITIVE PRESSURE PER THE PRESSURIZATION HEIRARCHY ON SHEET M401. REDUCE FLOW AS NEEDED TO AVOID DOOR WHISTLING.																								
2. BALANCE AIRFLOW PER THE PRESSURIZATION HEIRARCHY ON SHEET M401. AVOID DOOR WHISTLING.																								
3. TIE UNIT INTO EXISTING DUCTWORK AND CONTROLS.																								
4. PROVIDE BACKDRAFT DAMPER ON OA DUCT.																								

AIR CONDITIONING UNIT SCHEDULE

UNIT TAG	SERVES	LOCATION	MFGR.	MODEL	SUPPLY AIR(CFM)	SUPPLY FAN HP	MINIMUM OUTDOOR AIR (CFM)	FILTRATION	COOLING CAPACITY (MBH)	EAT (*F db/*F WB)	LAT (*F db/*F WB)	HEATING CAPACITY (MBH)	HEATING SOURCE	HUMIDIFIER CAPACITY (LB/HR)	HUMIDIFIER ELECTRICAL INPUT (KW)	V/PH/HZ	FLA	MOP	DISCONNECT PROVIDED BY	STARTER PROVIDED BY	DIMENSIONS (LxWxH)	WEIGHT (LBS)	NOTES
AC-1	ELEC 111	ELEC 111	LIEBERT	MMD60E7AHELG	2,500	1.5	0	MERV 8	62.7	75/61	51.2/50.7	56.2	ELEC	8	2.8	460/3/60	19.8	25	MECHANICAL	MECHANICAL	50X46X24	498	1,2,3
NOTES:																							
1. REHEAT TO BE STANDARD ELECTRICAL ELEMENT																							
2. PROVIDE FILTER BOX WITH MERV 8 FILTER AND SWEAT ADAPTERS																							
3. PROVIDE MANUFACTURE SUPPLIED NETWORK CARD TO COMMUNICATED WITH BUILDING AUTOMATION SYSTEM. VERIFY PROTOCOL TO BE USED WITH COR.																							

HEAT EXCHANGER

UNIT TAG	LOCATION	SERVES	MFGR.	MODEL	TYPE	HEAT EXCHANGED (MBH)	STEAM SIDE		WATER SIDE						NOTES
							FLUID TYPE	STEAM PRESSURE (PSI)	FLUID TYPE	FLOW RATE (GPM)	FLUID PD (FT H2O)	EWI (°F)	LWT (°F)		
HX-1	MECH 002	B4 ADDITION	BELL & GOSSETT	QSU 4 3-2	SHELL & TUBE	185	STEAM	7	50% PG	19.8	0.4	160	180	1	
NOTES:															
1. REFER TO SPECIFICATIONS FOR GLYCOL MAKE-UP SYSTEM.															

CONDENSING UNIT SCHEDULE

UNIT TAG	UNIT SERVES	MFGR.	MODEL	NOMINAL COOLING CAPACITY (MBH)	V/PH/HZ	MCA	MOP	DISCONNECT PROVIDED BY	STARTER PROVIDED BY	DIMENSIONS (LxWxH)	WEIGHT (LBS)	NOTES
CU-1	CRAC-1	LIEBERT	MCM160	-	460/3/60	5.6	15	MECHANICAL	MECHANICAL	204x46x82	860	1,2,3,4
CU-2	CRAC-2	LIEBERT	MCM160	-	460/3/60	5.6	15	MECHANICAL	MECHANICAL	204x46x82	860	1,2,3,4
CU-3	CRAC-3	LIEBERT	MCM160	-	460/3/60	5.6	15	MECHANICAL	MECHANICAL	204x46x82	860	1,2,3,4
CU-4	AHU-1	YORK	YCD60S44S3	57	460/3/60	11.6	20	MECHANICAL	MECHANICAL	34x34x32	195	1
CU-5	AC-1	LIEBERT	PFH067A-AL7	67	460/3/60	11.7	20	MECHANICAL	MECHANICAL	53x18x36	351	1
CU-6	AHU-2	YORK	YCJD24S41S1	24	208/1/60	12.4	20	MECHANICAL	MECHANICAL	24x24x28	129	1
CU-7	AHU-3	YORK	YCD30S44S3	29	460/3/60	6.0	15	MECHANICAL	MECHANICAL	24x24x28	131	1
CU-8	AHU-4	YORK	YCD60S44S3	57	460/3/60	11.6	20	MECHANICAL	MECHANICAL	34x34x32	195	1

NOTES:

- CONDENSING UNIT LOCATION SHALL BE BASED ON MANUFACTURERS CLEARANCE REQUIREMENTS.
- CONDENSER TO BE 60 INCHES HIGHER THAN RPB. PROVIDE 60" CONDENSER LEGS. LEGS TO BE FASTENED TO CONCRETE PAD VIA ANCHOR BOLTS.
- TWO LEE-TEMP RECEIVERS PER CONDENSER, EACH REVCIEVER TO HAVE SEPARATE 120V SUPPLY.
- PROVIDE AND FIELD-INSTALL MANUFACTURE SUPPLIED SURGE PROTECTION DEVICE.